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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No: GB/10847.321

Applicant:

Gholamabbas Hemiari et al.

Serial:

09/900,886

Filed:

07/10/2001

Group Art Unit::

2625

Examiner:

Desire, Gregory M.

Title:

SYSTEM AND METHOD FOR THE AUTOMATIC

EXTRACTION OF LINEAR FEATURES FROM DIGITAL

IMAGERY

REQUEST FOR REFUND

Office of Finance Fax: 571-273-6500

Sirs:

A fee of 500.00 USD was charged to deposit account 07-1742 on March 17, 2005 under fee code 2201 for independent claims in excess of three. The above application has only two independent claims. Please find enclosed a listing of the claims as of March 17, 2005.

A utility issue fee of 1,400.00 USD for large entity was charged to deposit account 07-1742 on April 25, 2005. The Assignee of this application, Université de Sherbrooke, being an institution of higher education, claimed small entity status under 37CFR 1.28. Please find enclosed the document where the small entity box was checked.

Therefore, please credit our deposit account 07-1742 in the amount of 1,200.00 USD.

Respectfully submitted,

July 29, 2005

Gwendoline Bruneau Reg. Nº 55,916

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Our File:

From-GOUDREAU GAGE DUBUC

10857.321 GB/ai

Applicant:

Gholamabbas Hemiari et al.

Serial No.:

09/900,886

Filed:

07/10/2001

Group Art Unit

2625

Examiner:

Desire, Gregory M.

Title:

SYSTEM AND METHOD FOR THE AUTOMATIC EXTRACTION OF

LINEAR FEATURES FROM DIGITAL IMAGERY

<u>AMENDMENT</u>

Mail Stop Amendment Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 U.S.A.

Dear Sirs:

In response to the Official Action mailed on September 23,2004, in connection with the above-identified patent application, please consider the following amendments and remarks. Response to the Office Action is due on December 23, 2004, with a possible additional three-month (3) extension of time.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace prior versions and listings of claims in the application.

Listing of claims:

Claims 1, 5-9, 13-15 have been amended, and claims 2-4 and 10-12 have been withdrawn as follows: <u>Underlines</u> indicate insertions and strikeouts indicate deletions.

1. (Currently amended) A method for the extraction of linear features from digital imagery, comprising the steps of:

providing a digital image;

providing a multi-layer database;

initializing a parameter domain;

successively applying the a_Radon transform on each position in the parameter domain;

for each position in the parameter domain:

finding the coordinates of the <u>a</u> nearest pixel in the digital image; determining the <u>a</u> numerical value of the <u>found</u> <u>nearest</u> pixel;

and

populating the layers of the provided multi-layer database in accordance with the determined numerical value of the found nearest pixel;

analysing the data of the <u>multi-layer</u> database <u>for linear features</u>; and generating an output image by restoring the <u>lines</u> detected <u>linear</u> features in the analysing step.;

wherein said step of providing a multi-layer database includes providing a multi-layer database having at least five layers: a first layer used to contain coordinates of zero value pixels; a second layer used to contain coordinates of non-zero value pixels; a third layer used to contain values of the non-zero value pixels; a

fourth layer used to contain the values of the zero value pixels, and a fifth layer used to contain an accumulation of the non-zero pixel values.

- 2. (Withdrawn) A method for the extraction of linear features as resited in claim 1, wherein the multi-layer database providing step includes providing a multi-layer database having at least three layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels and a third layer used to contain the values of the non-zero value pixels.
- 3. (Withdrawn) A method for the extraction of linear features as resited in claim 2, wherein, in said populating step:

the coordinates of the found pixel are stored in the first layer when the numerical value of the pixel is found to be zero:

the coordinates of the found pixel are stored in the second layer when the numerical value of the pixel is found to be non-zero;

the numerical value of the non zero pixels is stored in the third layer.

- 4. (Withdrawn) A method for the extraction of linear features as recited in claim 1, wherein the multi-layer database providing step includes providing a multi-layer database having at least five layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels; a third layer used to contain the values of the non-zero value pixels; a fourth layer used to contain the values of the zero value pixels and a fifth layer used to contain the accumulation of the non-zero pixel values.
- 5. (Currently amended) A <u>The</u> method for the extraction of linear features as recited in claim 4 1, wherein, in said <u>step of populating step the layers of the multi-layer database comprises:</u>

storing the coordinates of the found nearest pixel are stored in the first layer when the numerical value of the nearest pixel is found to be below a predetermined threshold;

storing the coordinates of the found nearest pixel are stored in the second layer when the numerical value of the nearest pixel is found to be above the predetermined threshold;

storing the a numerical value of the pixels having a value which is above the predetermined threshold is stored in the third layer;

storing the a numerical value of the pixels having a value which is below the predetermined threshold is stored in the fourth layer; and

storing the an accumulation of the numerical value of the pixels that have a numerical value which is above the predetermined threshold is stored in the fifth layer.

- 6. (Currently amended) A <u>The</u> method for the extraction of linear features as recited in claim 1, wherein said data analysing step of analysing the data of the multi-layer database includes the substep of finding the endpoints of each linear feature to be extracted.
- 7. (Currently amended) A <u>The</u> method for the extraction of linear features as recited in claim 6, further comprising the step of storing the endpoints found in a database which is used in the output image generating said step of generating the output image.
- 8. (Currently amended) A <u>The</u> method for the extraction of linear features as recited in claim 1, further comprising the step of providing the <u>a</u> minimum and <u>a</u> maximum length of the lines linear features to be detected.
- 9. (Currently amended) A system for the extraction of linear features from a digital image and for generating a corresponding output image, comprising:
- a controller provided with an input designed to receive a digital image and an output designed to provide a corresponding output image; said controller containing a multi-layer database; said controller being so configured as to:

initialize the a discrete parameter domain;

successively apply a Radon transform on each position in the parameter domain;

for each position in the parameter domain:

find the coordinates of the- a nearest pixel in the digital image;

determine the a numerical value of the found nearest pixel; and

populate the layers of the previded multi-layer database in

accordance with the determined numerical value of the found nearest pixel;

analyse the data of the multi-laver database to detect linear features; and

generate an output image by restoring the lines detected <u>linear</u> features in the analysing-step.;

wherein the multi-layer database includes at least five layers: a first layer used to contain coordinates of zero value pixels; a second layer used to contain coordinates of non-zero value pixels; a third layer used to contain values of the non-zero value pixels; a fourth layer used to contain values of the zero value pixels, and a fifth layer used to contain an accumulation of the non-zero pixel values.

- 10. (Withdrawn) A system for the extraction of linear features as resited in claim 9, wherein the multi-layer database includes at least three layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels and a third-layer-used to contain the values of the non-zero value pixels.
- 11. (Withdrawn) A system for the extraction of linear features as recited in claim 10, wherein, when populating the database, the controller is so configured as to:

store-the coordinates of the found-pixel in the first layer when the numerical value of the pixel is found to be zero;

store the coordinates of the found-pixel in the second layer when the numerical value of the pixel is found to be non-zero;

store the numerical value of the non-zero pixels in the third layer.

12. (Withdrawn) A cystom for the extraction of linear-features as recited in claim 9, wherein the multi-layer database includes at least five layers; a first layer used to contain the coordinates of the zero value pixels; a cocond layer

used to contain the coordinates of the non-zero value pixels; a third-layer used to contain the values of the non-zero value pixels; a fourth layer used to contain the values of the zero value pixels and a fifth layer used to contain the accumulation of the non-zero pixel values.

13. (Currently amended) A <u>The</u> system for the extraction of linear features as recited in claim <u>9</u> 12, wherein, when populating the <u>layers of the multi-layer</u> database, the controller is so configured as to:

store the coordinates of the found nearest pixel in the first layer when the numerical value of the nearest pixel is found to be below a predetermined threshold:

store the coordinates of the found nearest pixel in the second layer when the numerical value of the <u>nearest</u> pixel is found to be above the predetermined threshold;

store the <u>a</u> numerical value of the pixels having a value which is above the predetermined threshold in the third layer;

store the \underline{a} numerical value of the pixels having a value which is below the predetermined threshold in the fourth layer; and

store the an accumulation of the numerical value of the pixels that have a numerical value which is above the predetermined threshold in the fifth layer.

- 14. (Currently amended) A <u>The</u> system for the extraction of linear features as recited in claim 9, further comprising an output device connected to said output of said controller to receive the output image generated by said controller.
- 15. (Currently amended) A <u>The</u> system for the extraction of linear features as recited in claim 9, further comprising an input device connected to said input of said controller to supply the digital image to the controller.

-7-

REMARKS

Claims 1, 5 to 9, and 13 to 15 remain in the case.

Reconsideration of this Application and entry of the foregoing amendments are requested. Claims 1 and 9 have been amended in view of the Office Action and to better define what the Applicants consider their invention, as fully supported by an enabling disclosure. Claims 2-4 and 10-12 have been withdrawn and the remaining claims have been amended to correct clerical errors.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-2, 6-11 and 14-15 have been rejected under 35 U.S.C. § 103, first paragraph as being unpatentable over Maruo (6,259,809) in view of Bergman et al. (6,529,916). The Applicants respectfully traverse the rejection as follows.

Although Applicant believes that neither Maruo (6,259,809) nor Bergman et al. (6,529,916), alone or in combination, teach or even hint at a method as recited in the claims as examined. In order to expedite prosecution of the application, Applicant rewrites claims 4 and 12 as independent claims by incorporating the subject matter thereof in claims 1 and 9 respectively, and withdraws claims 2 to 4 and 10 to 12. Applicant consequently amends claims 5 and 13 to correct claim dependencies.

In view of the above and foregoing, it is respectfully requested that the Examiner withdraws his rejection of claims 1-2, 6-11 and 14-15 under 35 U.S.C. § 103.

Applicant further amends the claims to correct clerical errors.

-8-

The rejections of the original claims are believed to have been overcome by the present amendment. From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such an action is earnestly solicited.

Authorization is hereby given to charge deposit account no. 07-1742 for any deficiencies or overages in connection with this response.

Respectfully submitted,

GOUDREAU GAGE DUBUC

Jean H. Dubuc Reg. No. 26,374

Date: December 14, 2004

From-GOUDREAU GAGE DUBUC

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